

REMARKS

Applicants are submitting herewith a corrected formal drawing for Figs. 5 and 6 in accordance with the Examiner's request.

Claim Rejections - 35 USC §103

The Examiner rejects Claims 1-30 under 35 USC §103 as being unpatentable over "applicant's admitted prior art in combination with Chen." This rejection is respectfully traversed.

In order to advance the prosecution of this application, Applicants have amended all of the independent claims herein to recite the feature of forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode. This was the feature of dependent Claims 11, 13, 15, 17, 19, 21, 23, 25, 27 and 29 which have been canceled.

Although Chen discloses a method for producing a planar surface, the reference is directed to using the method to form an Ultra Large Scale Integration (ULSI). See. e.g. Col. 1, lns. 15-16 of Chen.

In contrast, the present invention as claimed is directed to a method of fabricating a display device by forming a pixel electrode and forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer.

In the case of a liquid crystal display device, the flat surface of the second organic leveling film of the claimed invention is important to facilitate an orientation control of the liquid crystal which makes a uniform image display without reducing the aperture ratio. Additionally, the flat surface of the second organic leveling film can achieve a high reflectance particularly in a reflective liquid crystal display device, which allows for realization of an image display with higher brightness which overcome a problem with prior devices. See e.g. page 3, lns. 5-16 of the present application.

In the case of an EL display device, the flat surface of the second organic leveling film is necessary to prevent a breaking of the EL layer since the EL layer is usually very thin (e.g. 50 nm or so).

Therefore, the claimed method of the present application is suitable for fabricating a display device either a liquid crystal layer or an EL layer.

As Chen does not teach or suggest a fabrication method for such a display device, the claims of the present application are patentable thereover. Accordingly, for at least the above-stated reasons, it is requested that the rejection of the claims of the present application be withdrawn.

New Claims

Applicants are adding new Claims 31 and 32 herewith. Applicants believe that these claims are directed to the features of Fig. 9C. These claims are also allowable for at least the reasons discussed supra.

If any fee should be due for these claims, please charge our deposit account 50/1039.

Conclusion

It is respectfully submitted that the present application is in a condition for allowance.

If any fee should be due for this amendment, please charge our deposit account 50/1039.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark J. Murphy", with a long, sweeping horizontal stroke extending to the right.

Mark J. Murphy
Registration No. 34,225

COOK, ALEX, McFARRON, MANZO,
CUMMINGS & MEHLER, Ltd.
200 West Adams Street, Suite 2850
Chicago, Illinois 60606
(312) 236-8500

Marked up copy of the amendments made herein:

IN THE CLAIMS:

Please amend the claims as follows:

1. (Third Amendment) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an
EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film.

2. (Third Amendment) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an
EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film and

wherein the thickness of the first organic leveling film is 0.1 μm or more and less than 1.5 μm .

3. (Third Amendment) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film, and

wherein the thickness of the second organic leveling film is from 0.1 μm to 2.9 μm inclusive.

4. (Third Amendment) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film, and

wherein the total thickness of the first organic leveling film and the second organic leveling film is from 0.2 μm to 3.0 μm inclusive.

5. (Third Amendment) A method of fabricating a display device comprising the steps of:

forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film, and

wherein the first organic leveling film and the second organic leveling film are insulating films formed by spin coating.

6. (Third Amendment) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film, and

wherein each of the first organic leveling film and the second organic leveling film comprises at least one of a polyimide resin and an acrylic resin.

7. (Third Amendment) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;

forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film over the gate wiring;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film, and

wherein the first organic leveling film and the second organic leveling film comprise the same material.

8. (Twice Amended) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first organic leveling film comprising resin over the gate wiring;
forming a second organic leveling film comprising resin on the first organic leveling film;
[and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film.

9. (Twice Amended) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;

forming a insulating film comprising an inorganic material over the gate insulating film;
forming a first organic leveling film over the insulating film;
forming a second organic leveling film on the first organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an
EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film.

10. (Twice Amended) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
applying a first layer comprising resin by spin coating;
baking the first layer to form a first organic leveling film;
applying a second layer comprising resin by spin coating;
baking the second layer to form a second organic leveling film; [and]
forming a pixel electrode on the second organic leveling film[,]; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an
EL layer over the pixel electrode,

wherein the thickness of the first organic leveling film is thinner than that of the second organic leveling film.

Cancel Claim 11.

12. A method according to claim 1, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 13.

14. A method according to claim 2, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 15.

16. A method according to claim 3, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 17.

18. A method according to claim 4, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 19.

20. A method according to claim 5, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 21.

22. A method according to claim 6, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 23.

24. A method according to claim 7, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 25.

26. A method according to claim 8, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 27.

28. A method according to claim 9, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Cancel Claim 29.

30. A method according to claim 10, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.

Please add the following new claims:

31. (New) A method of fabricating a display device comprising the steps of:
forming a semiconductor film over a substrate;
forming a gate insulating film on the semiconductor film;
forming a gate wiring on the gate insulating film;
forming a first inorganic film on the gate wiring;
forming a wiring on the first inorganic film;
forming a second inorganic film on the wiring;
forming a first organic leveling film on the second inorganic film;
forming a second organic leveling film on the first organic leveling film;
forming a pixel electrode on the second organic leveling film; and
forming one of a layer selected from the group consisting of a liquid crystal layer and an EL layer over the pixel electrode,
wherein the thickness of the first organic leveling film is thinner than that of the second

organic leveling film.

32. (New) A method according to claim 31, wherein the display device is used in one selected from the group consisting of a portable phone, a video camera, a computer, and a projector.